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SOVIET ACTIVITIES IN THE ARCTIC AND ANTARCTIC (3)

[Comment: Soviet Activities in the Arctic and Antarctic is a bimonthly report presenting information extracted from Soviet newspapers, periodicals, and books. This report includes information published up to 20 March 1956.

The report covers all Soviet activities in the Arctic and Antarctic with the exception of commercial shipping, which appears in the Summary series Transportation, Communications, Electric Power, and Construction in the USSR.

All temperatures in this report are given in degrees centigrade. Numbers in parentheses refer to appended sources.]

ARCTICPlans for Arctic Research Expansion

In the next few years, Soviet scientific research in the Arctic will be expanded, with two basic aims in view: first, to carry out the program established for the International Geophysical Year (IGY), and second, to aid in expanding utilization of the Northern Sea Route as outlined in the Sixth Five-Year Plan.

Scientific work will continue in the Central Arctic with the aid of permanent polar stations and observations posts established on drifting ice. As of March 1956, there were two of these drifting stations -- Severnyy Polyus-4 and Severnyy Polyus-5. The staff of Severnyy Polyus-4 will be replaced by new personnel in the spring, and the station will continue to operate. Severnyy Polyus-5, on the other hand, will be closed because it is drifting toward the strait between Greenland and Svalbard and will leave the Central Arctic.

In the spring of 1956, a new station, Severnyy Polyus-6, will be established in the general area where Severnyy Polyus-2 ended its drift 5 years ago. Tents left by the staff of Severnyy Polyus-2 when the station was abandoned have permitted tracking of the floe, and it has been observed that the drift has been on a closed, almost circular, track. Soviet scientists feel that this floe will provide an excellent base for thorough studies of the area in which it is drifting.

In 1956, as in years past, an aerial expedition will begin flights into the Central Arctic with the arrival of spring. These flights will take meteorologists and geophysicists into the area for short-term observations.

Scientific work will be expanded in the field of water studies along the Northern Sea Route during the next 5-year plan, and large-scale studies of the northern regions of the Atlantic and Pacific oceans will be inaugurated. Insufficient work has been done in these two oceans.

A complex expedition will be sent to the Greenland Sea during 1956 aboard the diesel-electric ship Ob' after her return from the Antarctic, and an oceanographic expedition will be sent to the Arctic aboard the icebreaker Litke.

Observations by Soviet polar stations will be stepped up in connection with the IGY, and these stations will be augmented by automatic radio-meteorological stations set on drifting ice in the seas of the Arctic. The five observatories of the Arctic Institute will also intensify their work in connection with the IGY. (1)

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The Drift Stations

M. Nikitin, an oceanographer at Severnyy Polyus-4, reported in early February that the station had drifted about 2,150 kilometers in the 10 months since the new staff had taken over operation of the camp. On 14 January, the station reached 87-20 N -- its most northerly penetration.

In January and February, the drift area was crossed by a continuous succession of cyclones characterized by enduring, high winds from various directions. Air temperature fluctuated sharply from minus 48 degrees to minus 7 degrees. Ice movement and hummocking was intense during this period, and the station's floe was considerably reduced in size by pressure.

Nikitin's report concluded by noting that the station's doctor, L. Ye. Ponomarev, removed the appendix of one of the staff when it became apparent that the man's condition was serious and a severe storm prevented the arrival of a plane from the mainland. The doctor was assisted by P. A. Gordiyenko, and the operation was successful.(2)

In its first 9 months of operation at Severnyy Polyus-4, the relief staff took more than 2,000 meteorological observations and launched over 530 radiosondes with an average monthly ascent of 18-24 kilometers. Stratospheric wind speed and direction were studied with the aid of a radio-theodolite, and more than 3,000 actinometric observations were completed.

The more than 300 depth soundings made during this period indicate that the ocean crossed by the station is characterized by a very uneven bottom. Local depths varied sharply over a small distance -- from 200 to 800 meters per day. In January, however, the station was over a large, flat-bottomed depression with depths around 4,000 meters.

Additional scientific observations will begin at the station in the near future. Aerologists Gaygerov, Dolganov, and Dunayev expect to receive new data from radiosonde ascents into the stratosphere, and oceanographers Shil'nikov and Telyayev will take on an additional program of testing new marine instruments.(3)

The following photographs of the drift stations and related activities appeared in a Soviet photograph album: First Aircraft Landed on Ice at Camp Site [Photo No 195901]; Interior of Pilot's Cabin on Polar Aviation Aircraft [Photo No 195902]; Cleaning Frost From Aircraft at Field in Arkhangel'sk [Photo No 195903]; 1954 High-Latitude Expedition Preparing to Take Off From Moscow Airport [Photo No 195904]; Helicopter Being Unloaded at Drifting Station [Photo No 195905]; Navigator at Work Aboard Aircraft of Polar Aviation [Photo No 195906]; Aircraft Being Loaded and Fueled at Airfield in Dikson [Photo No 195907]; Engine Preheaters Being Used on Aircraft at Field in Arkhangel'sk [Photo No 195908]; Geophysicist Measuring Ice Drift With Theodolite [Photo No 195909]; Pilot Mazuruk Standing Before Tail Assembly of Aircraft (apparently, a TU-4) [Photo No 195910]; Close-up of Snow Landing Gear [Photo No 195911]; Aerologists at Drift Station Prepare to Release Radiosonde [Photo No 195912]; Two Hydrologists and Hydrological Winch [Photo No 195913]; Aerologist Checks Radiosonde Equipment Before Release [Photo No 195914]; Helicopter at a Drift Station [Photo No 195915]; Unloading Motor Vehicle From Aircraft at Drift Station [Photo No 195916]; Interior of Radio Shack at Severnyy Polyus-3 [Photo No 195917]; Hydrologist at Severnyy Polyus-3 Unpacking Hydrologic Instruments [Photo No 195918]; General View of Drift Station Severnyy Polyus-3 [Photo No 195919]; Station Members of Severnyy Polyus-3 and Instrument for Measuring Drift Speed and Direction [Photo No 195920]; Aerologist Kanaki Employing Theodolite [Photo No 195921]; May Day Meeting at Drift

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Station Showing Aircraft and Personnel [Photo No 195922]; General View of Section of Severnyy Polyus-4 [Photo No 195923]; and General View of Drift Station and Aircraft on the Ice There [Photo No 195924].(4)

The following photographs appeared in the Chinese press: General View of Severnyy Polyus-5 [Photo No 195863]; Drift Station Personnel Taking Soundings [Photo No 195864]; Interior of a Drift Station Tent [Photo No 195862]; Drift Station Meteorologists and Instruments [Photo No 195865].(5)

Helicopter Flight Moscow-Drift Stations

In connection with the establishment of the drift stations in the Central Polar Basin, it was decided to transfer two helicopters from Moscow to the drift stations under their own power. One helicopter, manned by pilot A. Babenko, navigator A. Minakov, flight engineer V. Kunchenko, and flight technician G. Kuznetsov, was to be sent to Severnyy Polyus-3. Another helicopter, manned by pilot V. Mel'nikov, navigator V. Chernogorskiy, flight technician A. Prokhorov, and flight engineer Ye. Gorokhov, was to fly to Severnyy Polyus-4.

These two crews were briefed on arctic flying conditions by M. Titlov and other experienced personnel, and the two helicopters were made ready for the long flight.

On the morning of 20 March, in clear weather, the two helicopters left Moscow for Arkhangel'sk -- the first stage of the flight. They were accompanied on this part of the trip by two AN-2 aircraft piloted by Stupishin and Oshurkov.

The 1,000-kilometer flight to Arkhangel'sk was completed without incident, but bad weather there prevented the helicopters from continuing the trip immediately. On the next day, the flight was resumed, and at 1057 hours the Arctic Circle was crossed.

When approaching Nar'yan-Mar, the oil line in Babenko's helicopter cracked from the cold, and he was forced to land at the fishing village of Oksino, 18 kilometers from the city. The oil line was replaced in 2 hours, and the flight completed to Nar'yan-Mar.

When the flight was continued on the third day out, the aircraft encountered heavy snow and such poor visibility that altitude was reduced to 220 meters to help the navigator in identifying landmarks. The cabin windows of the aircraft were soon covered with snow, which was not removed by the deicing equipment, and it finally became necessary to open the side doors in order to see. With the heavy accumulation of snow on the aircraft, they became difficult to manage. Fortunately, however, Amderma was near at hand by this time and the planes were safely landed.

In Amderma, the helicopter crews were introduced to their first arctic purge with winds up to 25 meters per second and vast amounts of blowing snow. The storm failed to drive the local inhabitants to cover, however, and they came by dog sled from as far away as 60 kilometers to see the helicopters.

On the day the two helicopters left Amderma, the temperature was 28 degrees below zero and the sky was clear. Mel'nikov was flying ahead when it became apparent that his aircraft was swerving first to the right and then to the left. His hydraulic booster (gidrousilitel') had broken down, and a landing was necessary. A 2-hour wait on the snow was required before Prokhorov had replaced the hydraulic booster and the flight could be continued.

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Course was set for Mys Kamenny, but the aircraft were delayed by bad weather, and destination was not reached until the third day after leaving Amerma.

After eating and taking on spare fuel at Mys Kamenny, the two helicopters separated; Babenko's aircraft proceeded to Dikson and then to Severny Polyus-3, while Mel'nikov's proceeded through arctic towns and ports to Ostrov Vrangelya and then to Severny Polyus-4. On the flight to Ostrov Vrangelya, Mel'nikov stopped at Dudinka, Bukhta Tiksi, Chokurdakh, Kresty Kolymskiye, Pevek, and Mys Shmidt. This trip was made mostly in bad weather and the last 2 days were over water. It was impossible to approach the shore because of heavy fog and behind the fog lay mountain peaks. From Moscow to Mys Shmidt, the helicopter flew 7,500 kilometers.

On the third day after arrival at Shmidt, Mel'nikov's crew was aroused and informed that some 250 kilometers from Mys Shmidt an ice floe had broken off from fast ice and drifted out to sea carrying a Chukchi hunter with it. Mel'nikov took off immediately and after 2 hours of flying in various directions the marooned hunter was finally spotted. The floe on which he was standing was too full of cracks for the helicopter to land, however. Accordingly, a length of rope was lowered to him, and after he tied it around his body, the helicopter raised him from the floe and transferred him to another which was strong enough to support the helicopter while it landed and picked him up.

On 14 April, the helicopter proceeded to Ostrov Vrangelya, and the next day it arrived at Severny Polyus-4 and began service. The helicopter piloted by Babenko began service at Severny Polyus-3 several days later.(6)

Scientific Results From Drift Stations

V. Pasetkiy, scientific secretary of the Arctic Institute, has reported the following results of arctic research:

An analysis of microfauna taken from bottom samples obtained in the Arctic Ocean have permitted geologists to conclude that during the last 50,000 years there was a period of invasion by masses of warm Atlantic water into the central part of the arctic basin. This period, which resulted in a significant warming of the arctic climate, continued from 8,000 to 12,000 years and was replaced by a cold period, during which the influx of warm water was insignificant or stopped altogether.

Research on bottom core samples has also permitted the conclusion that the speed of currents on the eastern slopes of the Range imeni Lomonosov is less than on the western slopes.

The drifting stations Severny Polyus-3 and Severny Polyus-4 gathered a great deal of interesting data on atmospheric structure in the central arctic. It was found in particular that warm air masses from the Pacific Ocean are not infrequently met there, whereas until recently it was supposed that such air was principally from the Atlantic Ocean. New information on temperature fluctuations at various altitudes is also of great interest to meteorologists.

An analysis by A. P. Nikol'skiy of magnetic data gathered by the drift stations has established the presence of a "secondary zone" in the circumpolar area with increased intensity and frequency of magnetic disturbances.

Broad interpretations of observations from Severny Polyus-4 and Severny Polyus-5 in their operational period 1955-1956 can only be made after they complete their year's cycle of operation, but some interesting research can be reported already.

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At Severnyy Polyus-4, for example, interesting observations have been made on the formation and thawing of ice. On the basis of these observations, P. A. Gordiyenko has concluded that only winter ice is composed of salt water. Old or pack ice is formed basically from fresh melt water flowing from the ice surface in the summer and freezing on contact with the colder sea water.

An analysis by Soviet scientists of data at Severnyy Polyus-4 on ice drift and synoptic conditions shows that the floe on which the station is located drifted on a closed tract in a counterclockwise direction on the passing of a cyclone to the south of the station. On passage of a cyclone to the north, moving along the parallels, the station's floe drifted in a clockwise direction. These conclusions on ice drift require further study and verification, but in any case it is clear that atmospheric processes have a decided influence on ice drift in the Arctic Ocean.

In the course of a recent flight over the Arctic Ocean, pilot V. N. Zadkov found the remains of Severnyy Polyus-2 at 78-49 N and 178-37 E. In 1954, when the remains of this camp were spotted for the first time, it was located about 200 kilometers to the east of Severnyy Polyus-4 at almost the same latitude. In the ensuing 18 months before it was spotted again, Severnyy Polyus-2 had drifted only 300 kilometers to the north, while Severnyy Polyus-4 drifted straight to the north 1,100 kilometers. Thus the drift was vastly different although the two floes were not widely separated in initial locations.

Information has also been received on other branches of science. Severnyy Polyus-5, for example, passed over the Range imeni Lomonosov and made numerous soundings in this area; in particular, the station discovered a spur of the range with heights of 1,500-1,700 meters above the bottom.

Several weeks ago, Severnyy Polyus-5 observed an interesting and little studied phenomenon -- the intrusion into the high latitudes of a thick layer of warm air. This air was located at about 1,500 meters altitude and had a temperature of about plus 10 degrees, while the temperature at the ice surface was below zero. This condition endured for several days. (20)

Polar Stations

When two drift stations were established in the central polar basin in the spring of 1954, it was decided that an additional small polar station would be required on one of the distant northern islands to provide meteorological data for aircraft flying into the area of the drift stations.

In May 1954, the experienced polar flier P. P. Moskalenko flew to the island chosen for the base with equipment and provisions, in addition to the first three members of the station -- radioman Ye. Vetrov, meteorologist A. Artem'yev, and mechanic I. Isayev. These men would be the first inhabitants of the island.

(Note: While this source does not identify the island by name, the next item on communications difficulty at the Ostrov Ushakov station makes it quite clear that this is the station being discussed here.)

The island was found to be obscured by fog, as it so often is, and Moskalenko was forced to land on the ice nearby. When the weather improved, he transferred the staff to the station site and then completed several more flights from the mainland to bring in the remainder of the equipment and supplies.

The original staff on this island has now returned to the mainland and has been replaced by a larger group with new equipment for a scientific station. Vetrov is on his way to the Antarctic while the other two young men are working in other parts of the Arctic. (7)

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Almost 2 years later, P. P. Moskalenko, the same pilot who was involved in the establishment of the polar station described above, was making flights to the drift stations. On the night following his return from one of these flights, radio communications from the polar station at Ostrov Ushakov ceased. No radio operator in the Arctic was able to raise the station that night, or for the next week. It was decided that a flight to the island would be necessary to determine the cause of radio silence, and since "Moskalenko had flown to the island in the spring almost 2 years before to deliver cargo for its establishment," he was chosen to make the trip.

Moskalenko set out for Ostrov Ushakov via Dikson and Severnaya Zemlya aboard an aircraft with pilot M. V. Kostyrev, navigators V. I. Kovtun and M. M. Kononenko, and radio operator V. I. Novikov. Bearings from shore radio stations were taken every 10-15 minutes.

When the aircraft reached Ostrov Ushakov, Moskalenko landed, and the plane was met by the polar station workers who had been aroused by the sound of the aircraft motors. A. A. Bodunov, chief of the polar station, explained that it was very fortunate that Moskalenko's aircraft was carrying spare radio parts -- the station radio had been off the air because the sliding contact (dvizhok) was inoperative.

The broken part was replaced in several hours by the aircraft crew and polar station workers, and when the plane took off for the return flight to the mainland the Ostrov Ushakov radio was back on the air. (8)

The Soviet press reports that the power plant has been repaired ahead of schedule at the Ostrov Novaya Sibir' polar station. Meteorologists Yanko, Fedotov, and Starkov at this station have also carried out all necessary instrument repairs. (9)

Tour Through the Soviet Arctic

The following article represents excerpts from the account by a Soviet correspondent of his trip through the Arctic:

"On entering Tiksi, we saw a flying boat of the ice reconnaissance service standing at anchor after completing a long flight."

"We visited the department store of Tiksitorg (Tiksi Trade) in the city."

"From the Ploshchad' Stalina we could see the shore and the bay."

"On the day our convoy arrived in Tiksi, the icebreaking steamship Levanevskiy and the transport Volga had just tied up to the pier. Automotive cranes were unloading tractors, trucks, and construction machinery from their holds, while conveyers began dumping coal into the Levanevskiy's bunker from self-propelled barges and lighters." [Photo No 195866 shows the unloading of the Volga in Tiksi.]

"Coal arrives in Tiksi from the local mine Sogo, which operates on the opposite side of the bay."

"In mid-July, the first river convoys arrive in Tiksi from the Lena, and in the beginning of October the last maritime ships leave to the west. These 2 1/2-3 months are extremely busy ones in Tiksi."

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"Unlike its broad and deep lower reaches, the upper stretches of the Lena are shallow with consequent shipping difficulties to be overcome. This is now a problem of the past, however, for the new railroad Tayshet-Lena connects the middle navigable section of the river with the Trans-Siberian railroad."

"The inner roadstead at Tiksi contains a great many timber rafts. After arriving in Tiksi by river, the timber is shipped by maritime transport to the Yana, Olenek, Indigirka, Khatanga, Alazeya, and Kolyma rivers, to Chukotka, and to the islands of the Laptev Sea -- anywhere it is required for construction of new ports, polar stations, or settlements."

"In the inner roadstead, ships load timber directly from the water into their holds. Two such ships, the Suvorov and the Dekabrist, arrived in Tiksi from the east shortly after our convoy. They delivered cargo to Tiksi from Vladivostok and on the return trip will deliver Lena timber for construction in Yakutiya. While Tiksi was formerly a port for manufactured goods and produce, it has now become an important timber port also."

"Twenty years ago, the transfer of river vessels through the arctic seas was a real event, but now ships are operating on the Lena, Kolyma, Khatanga, Anabar, Olenek, Yana, and Alazeya rivers, and they were transferred there by sea."

"A list of ships which have visited Tiksi in the 1955 navigation season demonstrates the extent to which the Northern Sea Route is being utilized. The diesel-electric vessel Yenisey has visited Tiksi three times during the summer and autumn, completing voyages with cargo between the White Sea and the Pacific Ocean. The Yenisey completed one voyage from Tiksi to an island in the far north, delivering equipment and personnel for a new polar station. The MV Ko-operatsiya, which formerly operated on the Leningrad-London line, put in at Tiksi twice with passengers from Arkhangel'sk. Altogether many dozens of ships stopped at Tiksi on voyages from east to west and west to east."

"In Tiksi, as in Dikson, there is an observatory of the Arctic Institute which takes part in fleet planning and direction in conjunction with dispatchers and port workers. The Tiksi observatory receives weather and ice reports several times a day from the 23 polar stations located on the islands and on the shore of the Laptev Sea. Many ships under way and all aircraft flying ice reconnaissance maintain regular contact with the Tiksi radio center."

"The director of the Tiksi observatory, oceanographer V. P. Meleshko, informed us that he had received a message to the effect that we would soon be visited by the directors of the two drift stations, Gordiyenko and Volkov." (10)

"After conferences on questions of navigation with Gordiyenko and Volkov, we returned to Severnyy Polyus-5 with Volkov."

"Five hours after take-off, our navigator tuned his radio compass to receive the transmitter at Severnyy Polyus-5."

"After 8 hours of flight from Tiksi, we spotted an AN-2 biplane on the ice below the landing strip 'T.' When we had landed, we were met by the AN-2 pilot V. M. Perov, his navigator I. D. Kukhar', radio operator A. D. Kambulov, and station engineer A. I. Kirillin."

"After unloading his heavy two-engine aircraft, Min'kov took off again for the return flight to Tiksi while Perov flew us to the drift station in his biplane. The station was located 7 kilometers from the landing strip."

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"I knew V. M. Perov from earlier high-latitude expeditions and had last seen him in the Moscow subway when he was on his way to the administration to report prior to taking leave. At the office, however, he was informed that a helicopter had crashed during a landing attempt in fog about 40 kilometers from Severnyy Polyus-5. Perov immediately postponed his leave and set out with Ku-khar' in his single-engine AN-2. Flying a good 1,500 kilometers over the ocean, he delivered the crew from the wrecked helicopter to the station Severnyy Polyus-5 and remained there for the next month flying his 'air taxi.'"

"Since mid-April when the new station was organized, the floe on which it is situated has been reduced in size tremendously and the huts and tents have been moved to new locations. In early autumn, when we visited the station, it was surrounded by a large open water area which approached to within 100 meters of the camp in some areas and to within 50-60 meters in others."

"Sitting in the hydrologic tent with the young oceanographer Gudkovich, we recalled the days in spring of last year when Gudkovich was working with the Cherevichnyy-Ostrekin detachment. At that time, he was also working on his dissertation, which he completed in the winter. With the dissertation completed, he joined the new station at Severnyy Polyus-5 as chief of the oceanographer section. Five years ago, Gudkovich was the youngest member of the staff of Severnyy Polyus-2, organized under the direction of M. M. Somov. Two of Gudkovich's young schoolmates from the Higher Arctic School, Nikolay Shesterikov and Vladimir Spichkin, are now working under him at the drift station."

"Radio operator I. G. Galkin receives daily position coordinates from the geophysics section. The aerologists inform Glavsevmorput' (Main Administration of the Northern Sea Route) and Gidrometeoslužba (Hydrometeorological Service) on air masses in the high latitudes. The Arctic Institute in Leningrad receives reports on the movement of the station, ocean depths, and other information from the oceanographers."

"On the return trip to Moscow, we encountered ships moving across the Northern Sea Route wherever we stopped -- in Khatanga, Dikson, and Andorra."

Illustrations include the following: Oceanographer Spichkin at Severnyy Polyus-5 Prepares to Lower Apparatus for Temperature Measurements and Bottom Sample [Photo No 195869]; General View of Severnyy Polyus-5 [Photo No 195868]; AN-2 Aircraft and Mobile Scientific Group on the Ice 100 Kilometers From the Station [Photo No 195867].(11)

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Soviet Permafrost Research

The following excerpts are from an account by a Soviet correspondent on his trip to a permafrost research station:

"On reaching Igarka by ship, I walked up Ulitsa imeni Bolshoy Teatr until I reached the quarter of the "permafrostologist." Here, beyond a fence, stand the drilling derrick, laboratories, and houses of the permafrost scientific research station of the Institute of Permafrost Studies imeni V. A. Obruchev, Academy of Sciences, USSR."

"Aleksandr Mikhaylovich Pchelintsev, the chief of the station, and I put on fur hats, felt boots, and short sheepskin coats. This is the usual dress for permafrostologists doing underground work, and it is the mode all year around, for in the permafrost there is no difference between a warm summer day and a cold winter night."

"At the entrance to the shaft, there is a sign carrying the inscription, 'When going underground, lower marker.' We lowered two markers to indicate to others coming to the shaft that there were already two men underground. Ordinarily, the men do not work more than 2 consecutive hours in the shaft because of the cold and low supply of oxygen."

"The ceiling of the underground corridor was lighted by electric bulbs, revealing the ice crystals around them. The walls of dark earth were not braced in any way, for the frozen mass was strong enough without stanchions."

"Proceeding along the corridor, we entered the permafrost layer. Aleksandr Mikhaylovich checked the thermometers and recorders as we moved along."

"After proceeding a way down the corridor, he stopped and opened a door into one of the side rooms. The room contained a small table, instruments, graphs, and newspapers. Aleksandr Mikhaylovich explained that there are a great many cases in these rooms below the frozen layer, and these cases contain newspapers from all the war years which have been placed there for future generations. He explained that things are perfectly preserved there, and that Mikhail Ivanovich Sumgin had suggested in his time an entire underground museum."

"Scientific workers do their research in these ice rooms. Many different types of permafrost are encountered below the streets of Igarka, and this makes it an ideal location for study and experimentation. Permafrostologists at Igarka have developed new methods for rapid and reliable research on frozen rock, for example, and this has both theoretical and practical significance."

"This work is of particular importance because procedures and methods appropriate for the other three quarters of the earth are not usable in this remaining quarter where permafrost is encountered. A prospector, for example, may be making good progress through permafrost with a diamond drill when motor trouble arises. Drilling may be stopped for just 10 minutes, but this is enough time for the pipes to freeze to the hold sides, after which they can be marked off as lost."

"A shallow set pile may appear to be good for 100 years, but in just 2 years it may well be lying on the ground, expelled by the permafrost."

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"A railroad was built in Alaska on permafrost as hard as stone and long service was foreseen. Some time after, however, traffic on the new line was halted -- the bridges had moved and the embankments had thawed and run."

"The builders of Igarka have also been defeated by permafrost on occasion. The first houses built have become crooked, stoves are cracked, windows are twisted, and chimneys are split. The Igarka Timber Plant, which was built without advice from permafrostologists, must undergo 'treatment' every year."

"The entire area around the permafrost station serves as the surface laboratory where studies are made on the active layer. It is this layer which makes it possible to cultivate in the area, and although the thaw may only reach to a depth of 20 centimeters, this is enough for certain plants and crops. The permafrost actually aids agriculture in many cases because this area is low in precipitation and the underlying permafrost slowly releases moisture to plants growing above during the dry summer season."

The author then discusses some of the effects of the active layer on construction and notes that Soviet permafrostologists have "developed" a method to avoid ill effects from the active layer; namely, the insulation of the ground to prevent thawing. He continues:

"We returned to the laboratory where Aleksandr Mikhaylovich was awaited. The builder of a city Place of Culture was there for consultation; the foundation of even the most ordinary building is not laid now without advice from the permafrost station. Following this, a phone call was received from a store asking help in preventing spoilage of meat. Aleksandr Mikhaylovich, rather than appearing insulted that a scientist like himself was approached with such questions and informing the merchant that meat was not his business, calmly explained to the caller the necessary measures to be taken. No sooner had he hung up the phone than it rang again, this time with a call from the builders of a dormitory at the end of a new street who had encountered a seam of fossil ice."

"In recent years, a number of new streets have been built in Igarka -- Krasnoyarskaya, Turukhanskaya, Dudinskaya, Yeniseyskaya -- and houses built along these streets are standing perfectly with no settling or damage of any kind."

"Permafrost study is a new branch of science and many things still remain to be studied in the field. The causes of the phenomena themselves are not yet fully understood, for there are areas with a sufficiently severe climate to make permafrost formation highly probable, yet there is no permafrost present."

"Permafrost studies for information on the past is also an important field and one in which some startling findings have already been made. In the Skovorodino Far East permafrost station, P. N. Kapterev has done very interesting work on the thin layer of peat found deep in the permafrost. This scientist has removed samples of the peat and examined them. Within these samples, he found fungi spores, algae spores, bryophytes, and other plants. Ova of small crayfish (rachek khidorus) were also found. When the samples of peat were thawed, signs of life were noted which had been suspended since time immemorial by the cold. The crayfish stirred: Contemporaries of the mammoth had been awakened in the century of atomic energy."

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"It has become apparent through these experiments that a great deal of past life may be so revived and tremendous amounts of information can be so obtained on the earth's past."(12)

Labor Policy in the Far North

The workers and employees of administrative, cooperative, and public enterprises, institutions, and organizations located in the far north regions enjoy special privileges. In accordance with the Decree of the Presidium of the Supreme Soviet USSR of 1 August 1945, "Concerning the Benefits for People Working in the Far North Regions" ("Records of the Supreme Soviet USSR," 20 August 1945), these workers and employees are paid rated increases to their wages and are provided additional leave over and above leave established by existing legislation. They also enjoy housing privileges.

The following social security benefits have been set up for the workers in the far north regions: (a) in calculating the length of service which furnishes the right to receive pensions for old age, disability, and for prolonged meritorious service, one year of work in the far northern districts counts as 2 years of work; (b) the temporarily incapacitated who receive social security benefits also receive additional payments at the expense of the enterprise, institution, or organization employing them.

According to the decree of the Presidium of the Supreme Soviet USSR, 8 August 1955, in the case of temporarily disabled workers and employees who work in far north regions, the enterprise, institution, or organization employing them is required to pay them the difference between the amount of the benefits and their actual wages, including a rated increase. However, the benefits together with the additional payment must not exceed the maximum amount of benefits for temporary disability established by legislation. The maximum benefit at present for temporary disability is 90 percent of wages. In all cases, benefits must not exceed 100 rubles a day.

Accordingly, the enterprise, institution, or organization pays the worker the difference between the disability benefits due him and a sum equal to 90 percent of his actual wage. If the worker is not a member of a trade union, he is paid the difference between the benefits and a sum equal to 45 percent of his actual wage. In all cases, the benefits together with the additional payment by the enterprise, institution, or organization must not exceed 100 rubles a day.

For example, the average daily wage of a worker amounts to 70 rubles. The benefit due him as a member of a trade union with continuous service for 8 to 12 years amounts to 80 percent of his wages, i.e., 56 rubles a day. Therefore, the enterprise, institution, or organization, in this case, pays the worker 7 rubles per day (63 minus 56).

If the temporary disability is a result of injury received off the job, the additional payment of the enterprise, institution, or organization is reduced 25 percent, since in this case 75 percent of the amount due is paid. For example, if the average daily wage of a worker is 50 rubles and he has 6 years of continuous service, then the benefits due a trade union member are 70 percent of his wage, or 35 rubles a day. This means that the enterprise, institution, or organization makes additional payments for up to 9 percent of the salary -- 10 rubles a day (45 minus 35). However, if the disability is caused by an off-job injury, then the benefits are reduced by 25 percent (that is, by 8 rubles, 75 kopecks a day) and 26 rubles, 25 kopecks a day is paid. But the additional payment of the enterprise, institution or organization

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is also reduced, in this case also by 25 percent, i.e., by 2 rubles, 50 kopecks. Thus, the benefits together with the additional payments should amount to 33 rubles, 75 kopecks a day.

If the disability is caused by drunkenness or activities due to drunkenness (fights, injuries), then a single worker or employee is deprived of benefits during the whole period of his disability, while a family man is allotted benefits from the 11th day of the disability and only half of what is due. In this case, the additional payment of the employer is also reduced 50 percent. For example, with continuous service of from 8 to 12 years, a member of a trade union is eligible for benefits of 80 percent of his wages, which, based on an average daily wage of 60 rubles, amounts to 48 rubles per day, while the additional payments of the enterprise, institution, or organization amount to 6 rubles per day (54 minus 48). However, if the disability of a family man is caused by drunkenness or activities due to drunkenness, then beginning with the 11th day of disability, in the foregoing example, benefits of 24 rubles a day are paid and the employer must pay an additional 3 rubles per day.

In case of a reduction of benefits during the time of treatment or hospitalization, the payments of the enterprise, institution, or organization are conducted on the usual basis, that is, the difference between a sum equal to 90 percent of actual wages -- non-trade-union members, 45 percent of the actual wage -- and the actual amount of benefits paid.

In the case of maternity leave, if the social security benefits do not cover the whole amount of the actual wages, the enterprise, institution, or organization pays the difference between the hospital benefits and the full actual wage of the woman, including the rated increase.

During the period that the temporarily disabled worker, or woman on maternity leave, is outside the limits of the far north regions, the employing enterprise, institution, or organization makes no additional payments whatsoever.

Benefits comparable to the benefits for those working in the far north are also granted to workers and employees who work in remote areas. The same procedure of additional payments applies to the workers and employees of several other enterprises, institutions, and organizations where, in accordance with existing legislation, payments of the difference between social security benefits and actual wages, including rated increases, are made. (13)

Snow Vehicle Constructed

Under the direction of a group of Komsomols, the Moscow Aviation Institute imeni Ordzhonikidze has constructed an aerosled and presented it to the Leningrad Grain Sovkhoz of Kustanayskaya Oblast.

The sled has two seats, for driver and passenger, and a baggage compartment. It is powered by an engine driving an M-11 aircraft propeller. During trials on the snow of Khimki Reservoir, the sled attained speeds of up to 50 kilometers per hour.

The aerosled will be used by the sovkhos to maintain rapid communications with the rayon center.

[Photo No 195870 shows the ski-equipped aerosled carrying designation MAI-3 on nose.] (14)

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Arctic Books, Films, and Club

The Moscow Studio of Scientific-Popular Films has released its new film "Severnnyy Polyus" (North Pole). Scenario is by E. Dvinskiy, direction by L. Stepanov and Yu. Tarich, and photography by V. Chernyavskiy, Ye. Yatsun, and N. Solov'yev.

This film more so than its predecessors "365 Days on Drifting Ice" and "In the Central Arctic," deals with the scientific activities of scientists, seamen, and fliers in the Arctic.(15)

The Arctic Scientific Research Institute has completed work on the third volume of Istoriya Otkrytiya i Osvoyeniya Severnogo Morskogo Puti (History of Discovery and Development of the Northern Sea Route). This volume deals with Soviet arctic navigation during the first 15 years of Soviet power.(16)

The State Publishing House for Geographic Literature has published the brochure of Ye. I. Vyazov, "Roald Amundsen" which presents the life and works of the polar explorer.(17)

The Moscow Young Polar Worker and Seamen Club is becoming increasingly active, with visits and lectures by such notables as Papanin, Shcherbakov, Tolstikov, and Somov.

Glavsevmorput' has now decided to organize an excursion for the members of the club. The group will visit Novaya Zemlya, Zemlya Frantsa-Iosifa, Ostrov Dikson, Igarka, and Ust'-Kara.(18)

ANTARCTIC

In connection with present Soviet operations in the Antarctic, it is interesting to note the following statement made by D. I. Shcherbakov of the Academy of Sciences USSR in an article dealing with the Soviet Antarctic expedition:

"Several countries have attempted to lay claim to particular sectors of Antarctica. In 1949, the Geographic Society USSR was obliged to reiterate that priority of discovery in Antarctica belongs to Soviet scientists, and without the participation of the USSR the question of a regime for the Antarctic cannot be decided."(19)

Expedition Arrival and Unloading

The Soviet expedition was completely assembled on the coast of Antarctica with the arrival of the diesel-electric ship Lena and the diesel refrigerator ship No 7. The Lena arrived on the morning of 20 January (17), and the refrigerator ship No 7 arrived on the morning of 8 February, escorted through the ice by the Lena.(21)

En route to the Antarctic aboard the Lena, meteorologists under G. Tauber, aerologists A. Shchekin and V. Babarykin, and magnetologists A. Pushkov and Ye. Cherepanov carried out regular observations after crossing the 30th parallel of northern latitude. V. Nazarov began ice observations as soon as the ship entered Antarctic waters.(20)

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Refrigerator ship No 7 of 1,200 tons displacement and 1,200 horsepower, normally operates between Kaliningrad and the North Atlantic fishing fleets. The ship completed a trip to the Slava in Antarctic waters early in 1955, and was therefore chosen to transport provisions to the Soviet station on the Antarctic Continent.

The vessel's cargo included the following items to be unloaded at Mirnyy: 8 tons of poultry, 16 tons of fresh meat, 11,000 eggs, 7 tons of assorted sausages, 18 tons of potatoes, 4 tons of onions, 14 tons of beets, carrots, and cabbages, 10,000 lemons, 7 tons of apples, 6 tons of raisins and prunes, 45 cases of cognac, and supplies of caviar, butter, and canned fruits and vegetables.

The crew of refrigerator ship No 7 included the following men for this voyage: Captain M. A. Tsygankov, Chief Engineer N. D. Anisimov, Fourth Assistant Engineer B. Yegorov, Refrigeration Engineer K. Tubinov, Second Mate N. T. Shanin, and Engineman F. Lanskiy.(22)

As soon as the expedition's ships were in position south of the Haswell Islands at the location chosen for Mirnyy, unloading operations began on a 24-hour basis. When the ships were tied up directly to the ice edge, unloading was carried out by tractor trains across the ice, by cable drawn sledges, by cable aerial way (23), or by aircraft.(24) (Note: Source 24 also refers to unloading by "steel rails" directly from ship to shore, but it is not clear by the text whether this is a reference to the cable way or another method altogether.)

Workers at the base have been forced to build four roads across the fast ice to the mainland shore to allow cargo transfer. The first three roads were destroyed as a result of storm winds and ice movement. When tractors and cross-country vehicles were unable to operate on the ice, heavy cargo sledges were pulled from the ships by cables running to machines on the shore. The aerial way operated on a steel cable running from the ships to the shore, where it was fastened to the rocks.(23)

When the ships were forced to stand off the ice edge, unloading was accomplished in barges towed by a small towing cutter manned by L. Yermokhin, V. Popov, Yu. Smirnitkiy, and N. Zherebtsov.(21)

The Soviet press has commended the following personnel for their work during the unloading operations: Fourth Mate Yermokhin, Electrician Kostyuk, Navigational Electrician Nezgovorov, Ship's Carpenter Saprionov, seamen Afim'in, Belyayev, and Divnich, divers Gulyayev and Kurevlev, and enginemen Poluyanov and Koshkin. [There is no indication of which ship these men are from.] Tractors have been successfully operated by Sherkunov, Akent'yev, Khmara, Rogozhin, and Osipenko in spite of difficult conditions. Scientific personnel have contributed to the construction under the leadership of detachment chiefs Lisitsin, Gaynanov, Moroshkin, and Bogoyavlenskiy.(28)

[Photo No 195871 shows IL-12 aircraft on deck of Lena.]

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Construction and Equipping of Mirnyy

The Soviet base camp Mirnyy is located on rock outcroppings at 66-33 S and 92-57 E. As material was being unloaded from the expedition's ships, the camp consisted of only a few oval tents so frequently used in the Arctic (25), but by the end of January it was reported that foundations for 14 prefabricated wood buildings had already been laid under the direction of Engineer V. Somov. (23) By the beginning of March, 18 buildings had been raised. (26) Speaking at a meeting of the Geographic Society USSR in Leningrad, M. M. Somov stated that there would eventually be 22 living and work buildings at the camp. (29)

The camp territory, including the airfield, radio center, and other buildings, covers many thousand square meters, but the central portion is compactly built for the convenience of the inhabitants. The living quarters are sheltered on the windward side by five metal buildings -- a shop, a garage, and warehouses.

All service buildings, laboratories, and living quarters in the camp have heat provided by an electric hot-water system. An automatic telephone exchange with 50 numbers has been installed. (25)

The company room -- building No 4 on the main (Lenin) street (26) -- is housed in two huts in the center of the camp. The living quarters are connected to the company room and to each other by covered passageways. (25)

The radio station at Mirnyy made its first transmission on 6 February -- a message sent to the Ob'. (21) Shortly thereafter, radio communications were established with Moscow, and on 22 February, radio operator A. Rekach picked up the radio station at Severnyy Polyus-5. The aurora was observed for the first time in the Antarctic this same night. (26)

While construction of Mirnyy proceeded, the aerial detachment was occupied with assembly of its aircraft, which were delivered by the Ob' and Lena. The detachment's equipment includes an IL-12, an AN-2, and two LI-2 fixed-wing aircraft, and two MI-4 helicopters.

Ground transport facilities at Mirnyy include S-80 and KD-35 tractors, special small tractors, GAZ-47 snow-marsh vehicles, and dogs. (27)

Mirnyy was officially opened with flag-raising ceremonies on 13 February. A meeting of all personnel was held, and speeches were made by M. M. Somov; V. Golubev, expedition deputy chief; Captain I. Man; Captain A. Vetrov; I. Cherevichnyy; Kh. Greku, base chief; and M. Pipenko, chief of the young construction workers brigade. (2)

Scientific Coordination Between Soviet and Australian Expeditions

On 24 January, M. M. Somov made radio contact with the Australian expedition located some 1,300 kilometers to the west of Mirnyy and suggested that the two camps begin systematic exchange of meteorological data. The first Soviet observations were then transmitted to the Australians, and it was decided subsequently that such exchanges would be carried out on a regular basis.

Phillip Law, director of the Australian expedition, expressed the desire for a meeting with M. M. Somov. Accordingly, he set out for Mirnyy aboard the Australian expedition's ship Kista Dan, and arrived safely under escort by an aircraft piloted by I. I. Cherevichnyy.

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The Australian visitors remained at the Soviet camp for 2 days and observed all facilities and equipment.

"The visitors commented on Soviet use of aircraft under such conditions," the Soviet press states, "for the Australians themselves had only two small planes aboard their ship and these had but a small radius of operation."

Before the departure of the Australians, they were entertained at a dinner aboard the Ob', and then returned the honor aboard the Kista Dan. (30)

Antarctic Flights and Attendant Geographic Discovery

While the expedition's ships were being unloaded a number of reconnaissance flights were made in the area around Mirnyy. In the course of these flights, several new islands were found and changes were detected in the location and configuration of neighboring ice shelves. All such data have been entered on maps. (25)

At the end of February, A. Kash flew his aircraft to the most westerly part of the Davis Sea where a landing was made on the shore of William II Land, and the group making the flight ascended Gaussberg to make observations.

About this same time, the IL-12 completed its first flight deep into the continent. Piloted by I. I. Cherevichnyy (with Navigator Morozov, Radioman Patrushin, and Flight Engineer Mokhov), the aircraft flew from the ice strip at Mirnyy to the area of the south geomagnetic pole. During the flight, which meant a penetration of almost 1,500 kilometers into the continent, weather was clear, with visibility of about 50 kilometers.

In the area of the geomagnetic pole, the polar plateau was found to reach a height of 3,500 meters. (26)

In early March, this same aircraft made its second long flight, this time from Mirnyy toward the pole of relative inaccessibility where the station Sovetskaya will be established at about 86 S. Somov was aboard for the flight (as he was for the first flight to the interior), which lasted more than 10 hours and included 2,600 kilometers of flight under difficult meteorological conditions.

The first leg of the flight, to about 76 S and 79 E, was 1,100 kilometers in length, half the distance from the Davis Sea to the pole of relative inaccessibility. In that area, the polar plateau was found to reach a height of 3,400 meters, and air temperature was minus 30 degrees.

After studying this region, the aircraft turned to the east and completed the second leg of the trip, this one 500 kilometers in length. During this part of the trip, the aircraft was operating at 4,500 meters' altitude and air temperature was minus 35 degrees.

On reaching 76-S and 98 E, the aircraft returned to Mirnyy. The possibility of establishing intermediate bases on the way to the pole of relative inaccessibility was made quite clear by this flight. (31)

In the course of these survey flights, Soviet scientists found a so-called "oasis," an area of lakes and bare rock free from snow and ice, such as those described by Byrd in former years. A group of scientists from Mirnyy flew to the oasis area, about 350 kilometers east of Mirnyy, to study it more closely than was possible from the air. A temporary camp was set up for this purpose by the group -- including Korotkevich (21), Vyalov, Markov, Avsyuk, and others (8) -- at about 66-20 S and 104-10 E. (33)

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The oasis under study covers about 500 square kilometers and is entirely free of ice and snow. Numerous lakes and rivers were found throughout the area. Soundings have been made on these water areas and biological studies done on their contents.

Plant life in the oasis are represented by several types of lichens found on the rocks, occasional bryophytes found in stream beds, and microorganisms found in the lakes. Skuas and snow petrels were observed in the area also. (21)

Departure of Expedition's Ships From Mirnyy

With the completion of unloading operations at Mirnyy, the expedition's three ships have left Antarctica, and only the wintering party remains at Mirnyy.

The refrigerator ship No 7 departed from Mirnyy in the latter part of February, escorted through the ice to clear water by the Ob'. It will proceed to the South Atlantic to meet the whaling flotilla Slava and will then sail to a Soviet port. (34)

The diesel-electric ship Ob' was reported to have departed from Mirnyy in early March to begin an extensive oceanographic voyage. (31) The ship will sail from 93 E to 165 E (the Balleny Islands), then turn north to New Zealand. From New Zealand it will proceed to Australia and sail along the coast there. It will then return to the Davis Sea, continue across the Indian Ocean to the Atlantic, and finally return to a Soviet port. (26)

Throughout this voyage, aerometeorological, hydrological, hydrochemical, geological, and hydrobiological observations will be carried out under the direction of V. G. Kort.

There are many oceanographic features to be studied in the areas traversed, the most significant of which is the Australian-Antarctic Trough with depths in excess of 4,000 meters. The marine component of the expedition will make studies there on heat and water interchange between this area and the Pacific Ocean. Similar studies will be made on other oceanographic features in southern waters. In the course of the 3-month cruise, 200 deep water oceanographic stations will be taken. (31)

The Lena departed from Mirnyy on the morning of 17 March. (32)

Whaling Flotilla Slava

The Slava-5, one of the catcher ships operating with the whaling flotilla Slava in Antarctic waters, collided with an iceberg during a dark night in February. The iceberg was lying very low in the water and was not picked up by the vessel's radar. The collision caused severe damage to the underwater section of the ship, and the forward compartments were soon flooded. At the time, the ship was 300 miles from the ice edge and 3,000 miles from the nearest port, Capetown.

The crew of the Slava-5 applied mats over the holed section within 15 minutes after the collision, but even so the ship's pumps were unable to reduce the water level in the forward compartments.

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The SS Slava and several other catcher ships came to the aid of the Slava-5, and it was moored to the starboard side of the Slava while the factory ship's pumps began attempts to remove some of the water. Again, however, the water level could not be lowered, and divers went down to repair the damage. The divers placed two mats over the damaged portion and covered the whole forward part of the ship with a large hold tarp, while the factory ship maintained slight way ahead in order to keep the tarp pressed against the hull of the Slava-5. The damaged hull was then pumped out and a concrete patch inserted.

As soon as the weather improved, divers removed the mats and tarp, and with the aid of underwater welding apparatus, the damaged plates were repaired. The Slava-5 is now back in operation with the flotilla. (16)

At the end of January, the tanker Kherson was preparing for a voyage to the Antarctic. The voyage was planned in order to carry fuel for the whaling flotilla Slava. In addition, the Kherson will carry provisions and other cargo for the flotilla in its dry cargo hold and on deck. The ship is under the command of Captain Baklanov.

The Kherson is the third tanker of the Black Sea Steamship Company to make the trip to the Antarctic recently. The tanker Kerch' was nearing the Slava at the end of January, the Gor'kiy was expected to return about the same time to Odessa with whale oil from the Slava, and the Kherson was preparing to leave. (23)

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